

ON THREE NEW GENERA AND SPECIES
OF SCHIZOPTERINAE (HETEROPTERA-CRYPTOSTEMMATIDAE)
FROM AUSTRALIA

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Fig. 1-2.

THE minute bugs of the family Cryptostemmatidae are now known to have representatives of both subfamilies in the Australian fauna. The Cryptostemmatinae are as yet still represented by the one species *Ceratocombus* (*Xyloannus*) *australiensis* Gross (Gross, 1950), while the Schizopterinae are represented by a number of specimens in the collection of the South Australian Museum, and in a collection at present with Dr. P. Wygodzinsky in Tucumán, Argentina. The Australian Schizopterine material in the South Australian Museum collection contains a number of new genera and species, but of this material only three species (each belonging to a new genus) are represented by specimens in sufficiently good condition to merit their description. The description of the remainder awaits the acquisition of supplementary material.

To describe these new forms I have endeavoured to establish a more complete nomenclature for the main veins of the hemelytra than hitherto employed (Wygodzinsky, 1950, p. 11). The venation of *Pachyplagioides* gen. nov. (fig. 10) as one of the more simple among Schizopterinae and also more easily compared with the venation of certain other classic hepteropteran types (cf. the nymphal Coreid *Syromastes*, and the fossils *Dunstaniopsis* and *Prósbole*) is here described in detail.

In *Pachyplagioides* the thickened costal margin of the hemelytra is expanded around Sc, the second vein is R + M, dividing about one-third of the way along the hemelytron into R and M. R is two-branched, the external branch to Sc is R_{1+2} and the portion running posteriad to the hind margin is Rs. That the outward turning portion of the vein is R_{1+2} , rather than R, only, is best shown by comparing Wygodzinsky's figure of *Chinannus bierigi* (Wygodzinsky, 1948, fig. 15) with Tillyard's figure of *Dunstaniopsis triassica* (Tillyard, 1918, text fig. 18). The first division of R + M is into R_{1+2} and Rs + M. In both *Chinannus* and *Dunstaniopsis* R_{1+2} then continues for a little way as a composite vein before dividing into R_1 and R_2 . Rs + M subsequently divides into Rs and M, and then Rs in both genera divides into R_3 and R_{4+5} , and it is R_{4+5} which in both genera receives the R — M cross vein.

M gives off a cross vein to Cu before the latter reaches the region of $1A + 2A$ (*vide infra*) which is doubtless the M—Cu cross vein of wide occurrence in insects, and then M receives another connection with Cu from the region of the junction of Cu and $1A + 2A$. A comparison with *Syromastes* and *Dunstaniopsis* has led me to believe that this is the outward turning branch of Cu (Cu_{1a}?) which more or less follows the *dividing line* to meet elements of M. This is much better shown in Wygodzinsky's figure of *Humptalanannus additilius* (Wygodzinsky, 1950, fig. 192). M in *Pachyplagioides* after the junction with Cu turns outward, branching to send an outward element to join R at the division of R₁ and R_s (the R—M cross vein of wide occurrence in insects) and then turns inward to join Cu; this last very reminiscent of the formation of the larger membranal cell in *Miroidea*. Cu follows very close to the claval suture but exterior to it and receives M—Cu from, and gives off Cu_{1a} to M and also receives $1A + 2A$ then proceeds posteriad (as Cu_{1b} + Cu₂!) to join M just anterior to the posterior margin. $1A$ and $2A$ are separate over most of the clavus in *Pachyplagioides*, but fuse just in front of the claval suture in this genus and cross the suture as a composite vein $1A + 2A$ to join Cu.

The venation of all other Schizopterinae seems easily comparable with, though often more primitive than that of *Pachyplagioides*. R₁₊₂ branches into its 2 component veins in *Chinannus* while in some other genera (e.g. *Ommatides*, *Schizoptera*, *Scabranannus*, etc.) R₁ and R₂ are given off separately before R_s and M separate. A fairly constant feature appears to be the two cross veins connecting M and Cu (M—Cu and Cu_{1a}) and the usually rectangular cell enclosed by them (mc). Cu may not join with M to form the closed cell characteristic of *Pachyplagioides*, *Dictyonannus* gen. nov., *Humptalanannus*, *Vilhenannus*, *Tropistrochus*, etc., but continue to the apical margin as in *Pachyplagia*, or disappear without reaching the margin as in *Ceratocomboides*, *Schizoptera*, *Corixidea*, *Membracioides*, *Nannocoris*, *Dundonannus*, *Scabranannus*, *Humptalanannus*, etc., and in some of these genera no distinct $1A + 2A$ is formed, $1A$ and $2A$ join terminally without continuing on forming a single ring-shaped vein (*Ceratocomboides*, *Schizoptera*, etc.).

The Schizopterinae have long been recognized as an extremely archaic group within the Heteroptera on the peculiar structure of the antennae, the diversity of the venation, the almost complete lack of differentiation of the hemelytra into corium and membrane, the ill-defined clavus and claval suture, and in the somewhat arched hemelytra of some genera, e.g. *Dictyonannus* gen. nov., a character reminiscent of Homoptera. The brachypterous forms of Schizopterinae often show even more primitive features, e.g. the apparent complete lack of a clavus in many brachypterous forms.

In several genera there are vague indications of an incipient differentiation between corium and membrane on the hemelytra, for example in *Pachyplagioides* Cu_{1+2} , M (after its junction with Cu_{1a}) and R_{1+2} all follow an oblique line reminiscent of the behaviour of these same veins along the *dividing*

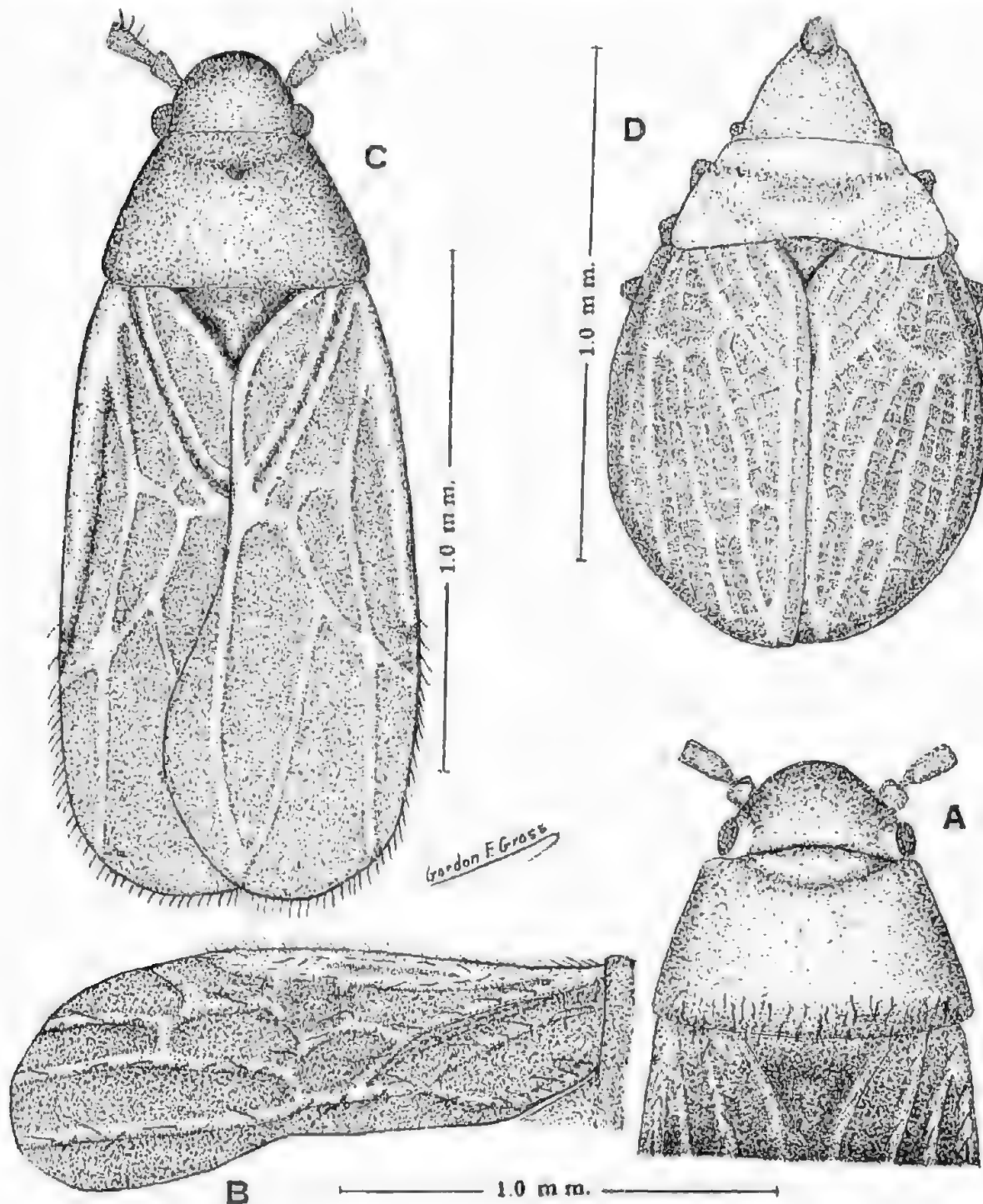


Fig. 1. A, dorsal view of head and pronotum and B of *Pachyplagia australia* n. sp. B, dorsal view left clytron. C, dorsal view *Pachyplagioides reginae* n. sp. D, dorsal view *Dictyognathus flavus*, n. sp.

line in the *Syromastes* nymph and in *Dunstaniopsis*, something the same thing occurs in *Dundonannus* and is best marked of all in *Humptatanannus addititius* (Wygodzinsky, 1950, fig. 192). Some forms (*Humptatanannus*, *Dundonannus*, *Vilhenannus*, *Corixidea* and *Membracioides*) have a well marked node on the costal margin, and such genera as *Pachyplagioides*, *Nannacoris* and *Humptatanannus* show a marked thickening of the costal margin (which affects only Sc in these genera but includes both Sc and R in *Pachyplagia*) a posterior spreading of which might be the method by which corium and subsequently clavus have become hardened and the venation obsolete in the more highly developed heteroptera.

The Schizopterinae seem to have separated from the main bulk of Heteroptera at about the stage of the Dunstaniidae; the wing venation of *Schizoptera* especially as regards M is much more simple than in Dunstaniidae, and can be more or less derived from that of this family. But an extremely puzzling complication arises here that many Schizopterine genera show no trace of a *dividing line*, a feature more primitive than *Dunstaniopsis*. There can only be two explanations for this, either the arrangement of veins in *Humptatanannus*, *Plachyplagioides*, etc. resembling a *dividing line* is purely accidental, and that the Schizopterinae separated from the stem of recent Heteroptera before the true *dividing line* appeared¹, or there has been an actual loss of the *dividing line* in those forms which show no trace of anything resembling it, e.g. *Dictyonannus*, in which case time of separation of the Schizopterinae from other Heteroptera is maybe much later and certainly occurred after the formation of a *dividing line* in Heteroptera.

My thanks are especially due to Mr. N. B. Tindale for considerable assistance in the elucidation of the wing venation of these forms.

The three new Australian forms may be distinguished with the following key:

1. Hemelytra with a fine "herringbone" sculpture between the main veins
Dictyonannus flavus gen. et. sp. nov.
- Hemelytra not as above 2
2. Cu_{1a} given off from Cu at the junction of Cu with $1A + 2A$
Pachyplagioides reginae gen. et. sp. nov.
- Cu_{2a} given off from Cu well after the junction of Cu with $1A + 2A$
Pachyplagia australia gen. et. sp. nov.

¹In some Tropiduchidae (Homoptera) e.g. *Oasa* spp. a structure analogous to the "dividing line" in modern Heteroptera occurs together with a well advanced differentiation of the tegmina into a "corium" and "membrane" in addition to the clavus. This similarity to the hemelytron of a Heteropteron is certainly accidental in this case.

PACHYPLAGIA gen. nov.

Shape elongate oval. Head and pronotum strongly declivous, hemelytra flat. Eyes moderate in size, several times smaller than the distance between them. Ocelli absent. Rostrum short, robust, attaining only midcoxae. Third segment of antennae longer than fourth.

Pronotum trapeziform, punctate, a distinct pronotal collar present. Lateral margins straight, anterior and posterior convex. Scutellum triangular extending well back under pronotum, this region exposed in some specimens and separated from region normally exposed by a transverse sulcus, this sulcus lying in specimens in which the rest of the scutellum is not exposed, just under hind margin of pronotum. Propleura enlarged, sac-like, produced forward to level of eyes, metapleura with a posterior lobe only. Metasternum with a longish backwardly directed spine.

Legs normal, tarsal formula 2.2.3. in both sexes. Claws long and curved. Arolia not conspicuous.

Hemelytra with well marked and developed venation (fig. 1B). Under special lighting the thickened costal margin is seen to be composed of Sc and R which are separated near the centre of this costal thickening by a short longitudinal groove. Cu along claval suture also only visible under special lighting. Cell *mc* hexagonal, Cu_{1a} given off after junction of Cu and $1A + 2A$, M gives off three branches to R the most exterior R—M (to R_{4+5}), R_s (R_{3+4+5}) emerges from near end of thickened costal margin and divides into R_3 and R_{4+5} . $1A$ and $2A$ are separate over most of the clavus then merge into $1A + 2A$ which crosses the claval suture to join Cu. Cu_{1b} (+ Cu_2) continues straight to hind margin after Cu_{1a} is given off to M. Wings with a very fine net-like reticulate venation.

Male genitalia asymmetrical right clasper the largest, vesica long and slender and coiled, near anus a long apparently movable process reminiscent of a bovine tail which is probably the anophore (or possibly a third free appendage).

Female genitalia apparently symmetrical, without gonopophyses.

PACHYPLAGIA AUSTRALIA sp. nov.

Fig. 1 A, B, 2 A, B, C.

Holotype male *forma macroptera*.

Coloration. Pronotum, head, eyes, scutellum, thickened costal margin and underside of abdomen brown; legs, rostrum and antennae yellowish brown.

Structure. As for generic description. Head 360μ long, width across eyes 600μ , lengths of segments of antennae 80μ , 80μ , 430μ , 340μ , first two segments with short hairs (30μ), second pair with much longer hairs, one long, one near the base of segment IV being 280μ . Rostrum 240μ long, lengths of segments 60μ , 50μ , 110μ .

Pronotum 430μ long, anterior width 580μ , posterior width 620μ . Lengths of podomeres, femora I 420μ , II 460μ , III 540μ , tibiae I 530μ , II 460μ , III 700μ , tarsi and claws I 220μ , II 220μ , III 530μ .

Body covered with a sparse pilosity apparently absent in the cells of the hemelytra and on the wings. The longest hairs on the abdomen congregated around the pygophore (up to 90μ).

Total length 2000μ . Greatest width 620μ .

Allotype female *forma macroptera*.

As for male. Spermatheca as figured. Lengths podomeres femora I 440μ , II 480μ , III 560μ , tibiae I 470μ , III 720μ , tarsi and claws I 230μ , II 220μ , III 350μ , lengths segments antennae, 110μ , 89μ , 470μ , 370μ lengths segments rostrum 80μ , 60μ , 160μ .

Holotype ♂ and allotype ♀ from Sydney, N.S.W., H. W. Cox (Nos. I 20,053 and 20,054), 41 paratypes from Sydney, N.S.W., H. W. Cox and A. M. Lea, and Port Lincoln, S.A., A. M. Lea (inquilines), all specimens in the collection of the South Australian Museum (Nos. I 20,055 to I 20,061).

PACHYPLAGIODES gen. nov.

General form elongate oval. Head short, width across eyes greater than length. Eyes moderately larger, several times smaller than the distance separating them dorsally. Ocelli absent. Clypeus not salient. Rostrum just reaching mid-coxae. First two segments of antennae equal in length and together somewhat shorter than length of head, remaining segments ?

A distinct prenotal collar present, pronotum trapeziform, posteriorly wider than long, posterior margin almost straight, anterior slightly convex. Scutellum acuminate, length subequal to basal width. Meso- and metapleura normal, metapleura with slight angle posteriorly.

Legs moderately slender, all leg segments including coxae setose, tibia markedly so. Claws simple, arolia rounded. Tarsal formula 3,3,3.

Hemelytra with a well marked and developed venation (fig. 1C). Sc running only $\frac{2}{3}$ of the costal margin which is strongly thickened, R + M is fused with Sc along its basal quarter, R + M divide about half along Sc, R divides only in two branches, R_{1+2} and R_{3+4+5} . Cell mc rectangular, Cu_{1a} given

off at point of fusion of 1A + 2A with Cu, Cu_{1b} and M merge distally, R—M meeting Rs (R₃₊₄₊₅) at point of separation of R₁₊₂. 1A and 2A separate over most of the clavus, uniting just before claval suture into 1A + 2A which crosses the suture to fuse with Cu.

Abdomen of male apparently strongly chitinized. Asymmetrical claspers present. Vesica short, robust.

PACHYPLAGIODES REGINA sp. nov.

Fig. 1 C, 2 D, E, F, G, H, I, J.

Holotype male *forma macroptera*.

Colouration. Dark chestnut brown; legs, first two segments of antennae and rostrum yellowish and hemelytra yellowish, infuscated.

Structure. As for generic description. Head 250 μ long, width across eyes 260 μ , width across eyes 260 μ . First 2 segments of antennae as in figure (2 I) each 95 μ long, remaining segments missing. Rostrum stout, total length 220 μ and width at base 60 μ .

Pronotum dimensions: anterior width 370 μ , posterior width 530 μ , length 410 μ , lateral margins with fine hairs. Scutellum punctate, width at base 170 μ and length 160 μ .

Femora normal, sparsely setose, tibiae slender, hind tibiae slightly curved. Tibiae more setose than femora with longish spines (up to 130 μ) on their outer margin and much denser and generally shorter (50 μ) pairs on their inner margins. Coxae with sparse and longish (100 μ) hairs near articulation with femora. Dimensions of podomeres: femora I 410 μ , II 430 μ , III 430 μ ; tibiae I 430 μ , II 410 μ , III 620 μ ; tarsi and claws I 160 μ , II 160 μ , III 230 μ .

Veins of hemelytra with scattered hairs up to 30 μ long, costal margin with longer hairs (95 μ) beginning near the end of Sc, and passing around the posterior end of wing longest posteriorly.

Ventral abdominal segments (except genitalia) without appendages with sparse hairs (up to 80 μ) and a clothing of extremely short hairs (only several μ long).

Male genitalia as figured.

Total length: 1640 μ . Greatest width: 620 μ .

Holotype male from "Fallen leaves, Cairns District, Queensland, A. M. Lea," in the collection of the South Australian Museum (No. I 20,052).

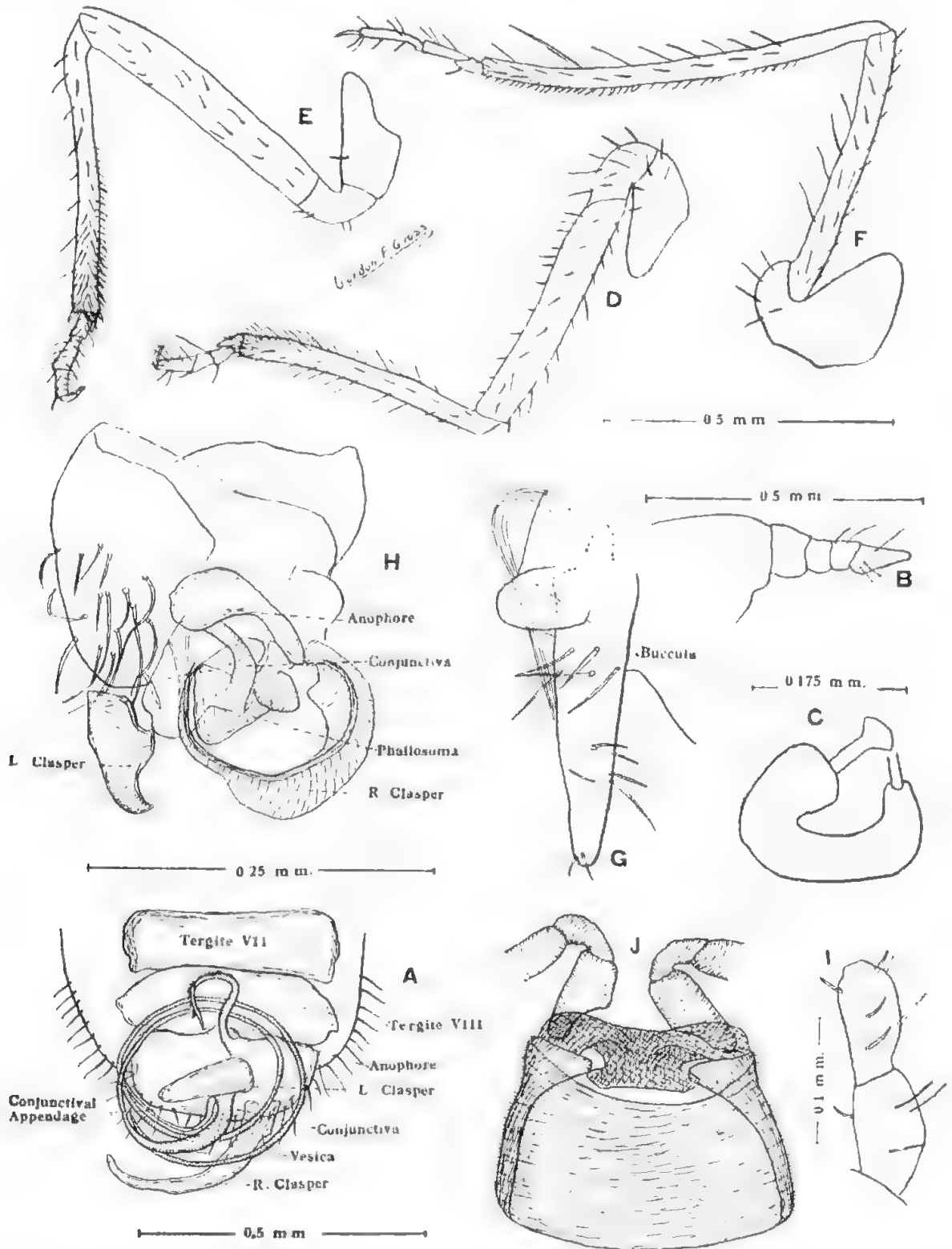


Fig. 2. A. dorsal view male genitalia, B. rostrum and C. spermatheca of *Pachyplagia australia*. D. fore leg. E. second leg. F. hind leg. G. rostrum. H. male genitalia from above. I. first two segments of antennae and J. Prosternum of *Pachyplagioides reginae n. sp.*

DICTYONANNUS gen. nov.

Shape broadly pear-shaped. Head conical, clypeus very slightly salient. Eyes very small, ocelli absent. Head beneath sulcate from just behind rostrum to anterior margin of prosternum. Antennae inserted ventrally very close to the raised edges of the sulcus. First two segments only present, remainder apparently lost. Rostrum reaching to about mid-coxae. First segment incrassated, second longer than first, and third longer than first two together.

Anterior margin of pronotum nearly straight, posterior margin concave, lateral margins straight, diverging posteriad, hind angles rounded; pronotum nearly twice as broad as long, subequal in length to head. Pronotum dorsally with a curved transverse constriction. Prosternum and mesosternum showing a continuation of the ventral sulcus of the head; on hind margin of mesosternum this rises and becomes a nearly horizontal backwardly produced spatulate spine. This sulcus has a raised keel on either side. Propleura pouch-like in which are inserted the fore coxae, propleura produced well in front of eyes. Metapleura not produced back in spine but only as a lobe. Scutellum triangular.

Femora of all three legs subequal, tibia I and II shortest and tibia III longest; tarsi I, II and III subequal. Tarsal formula 2.1.1.

Elytra very convex and very coriaceous costal margin broadly reflexed, turning outwards before doing so to form (looking from above), a kind of gutter. Venation as figured (fig. 1D), with a fine herringbone sculpture between the main veins. Sc not discernible but apparently following the costal margin. R_{1+2} and Rs undivided. Cell mc long, anterior margin (M) sinuate Cu_{1a} meeting M $\frac{2}{3}$ the length of hemelytron and well past the fusion of $1A + 2A$ and Cu, $Cu_{1b} + Cu_2$ joins M before posterior margin. R—M cross vein a little further exterior in position to Cu_{1a} ; $1A$ and $2A$ separate over most of the elavus uniting just anterior to the claval suture into $1A + 2A$ and crossing the suture to fuse with Cu. Ventral abdominal segments strongly chitinized. No asymmetrical gonopophyses present in female genitalia.

DICTYONANNUS FLAVUS sp. nov.

Fig. 1 D.

Holotype male.

Colouration. Honey coloured. Eyes red.

Structure. As for generic description. Length of head 170μ , width across eyes 300μ , lengths 2 segments of antennae present 40μ and 60μ , second segment

only with a few sparse hairs (20μ). Rostrum 510μ long, lengths of segments 60μ , 110μ , 340μ .

Pronotum 250μ long, anterior width 260μ , posterior width 450μ . Lengths podomeres, femora I 230μ , II 230μ , III 250μ , tibiae I 28μ , II 260μ , III 330μ , tarsi and claws I 160μ , II 160μ , III 160μ . Scutellum 160μ long and 250μ wide basally. Hemelytra 780μ long. Ventral abdominal segments with sparse hairs, longest (35μ and subclavate) on the pygophore.

Total length: 1240μ . Greatest width 780μ .

Holotype female (Cairns District, 1 ♀, A. M. Lea, in fallen leaves, in the collection of the South Australian Museum (No. I 29,062)).

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